

REMARKS

Claims 1-2 are pending in this application, with claims 15-22 being withdrawn from consideration. Figures 1 and 2 of the drawings are objected to. Claims 3, 7 and 14 are objected to because of informalities. The specification is objected to because of informalities. Claims 1, 7 and 13 are rejected under 35 USC 102 as being anticipated by Pfefferle '863 and also as being anticipated by Pfefferle '547. Claims 3, 5, 6, 9, 11 and 12 are rejected under 35 USC 103 as being unpatentable over Pfefferle '863 or '547 in view of Kojima. Claim 14 is rejected under 35 USC 103 as being unpatentable over Pfefferle '863 or '547 in view of Haz or Groppi. Claims 2 and 8 are rejected under 35 USC 103 as being unpatentable over Pfefferle '863 or '547 in view of Hughes and Dalla Betta. Claims 4 and 10 are rejected under 35 USC 103 as being unpatentable over Pfefferle '863 or '547 in view of Kojima and further in view of Hughes and Dalla Betta. Claim 1-14 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting.

The replacement drawing sheet 1 of 2 attached hereto contains revised FIGs. 1 and 2 that correct the informalities identified by the Examiner. Reference numeral 20 now points to the preheat burner casing and reference numeral 40 now points to the wash coat beneath the catalyst material 26.

Claim 7 is amended herein to delete the word "further" per the Examiner's request.

The specification is revised herein to correct a typographical error and to provide the full-word descriptions in addition to the objected-to abbreviations. The processes described in the specification are well known in the art by their respective abbreviations and these changes do not represent new matter.

Claim 1 has been amended herein to include the limitations of "the thermal barrier coating comprises a columnar grained structure comprising a plurality of primary columns each supporting a respective plurality of secondary branches such that the thermal barrier coating exhibits a specific surface area of at least 18 m²/g." Claim 7 has been amended to include the limitations of "the thermal barrier coating

comprising a plurality of primary columns approximately 10 microns in diameter and 10 microns in height each supporting a plurality of cones approximately 1 micron in diameter and 1 micron in height, the thermal barrier coating exhibiting a specific surface area of between 50-150 m²/g." These amendments overcome the rejections under 35 USC 102(a) based on Pfefferle '863 and '547. These references actually teach away from such limitations because Pfefferle describes his thermal barrier coatings as being applied by "flame spray techniques or other similar means known in the art" ('863 column 3, lines 51-53), which do not result in a columnar structure or such an SSA value.

The applicants traverse the Examiner's interpretation of the Kojima reference that are relied upon for the rejections under 35 USC 103(a). The Examiner states that Kojima discloses a thermal barrier coating having a plurality of primary columns, secondary branches and tertiary branches. The Examiner does not provide a specific citation to support this statement, but the applicants suspect that this is based upon column 7, lines 40-52 of Kojima. A closer reading of Kojima reveals that the secondary columnar texture of Kojima is nothing more than co-joined adjacent primary columns with the secondary columnar texture looking like a "wide" primary column. Each secondary columnar texture of Kojima is supported at its base from the substrate, not from an adjacent primary column. The secondary columnar texture of Kojima contains no secondary branches that are supported by a primary column, as described and claimed in the present application. This difference may be appreciated by comparing FIG. 5 of the present application, where a primary column 44 supports secondary branches 46, with FIG. 20 of Kojima, where secondary texture 32 is nothing more than co-joined side-by-side primary columns 31. Similarly, the tertiary texture 33 of Kojima is nothing more than three side-by-side primary columns 31, whereas as illustrated in present FIG. 5, the tertiary branches 52 of present claims 6 and 25 are supported by the secondary branches 50 which in turn are supported by the primary columns 48. Thus, the rejections under 35 USC 103(a) that rely upon Kojima are not supported by the art and should be withdrawn.

The amendments of independent claims 1 and 7 also serve to overcome the provisional double patenting rejections.

New claims 23-30 have been added. None of the cited prior art teaches or suggests using a single layer of ceramic material both as a thermal barrier coating and as a combustion catalyst. The prior art devices, such as taught by Pfefferle teach away from these claims by including separate thermal barrier coating and catalyst layers. Dependent claims 24 and 25 add limitations related to the structure of the material and its SSA value. Dependent claims 26-30 add limitations related to specific materials that may be used for this dual purpose. Nothing in the prior art teaches or suggests that these materials may be used in a catalyst element to provide both a catalytic and thermal insulation function.

Reconsideration of the amended application in light of the above Remarks and allowance of claims 1, 2, 6-8 and 23-30 are respectfully requested.

Respectfully submitted,

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